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(12) # EUROPEAN PATENT APPLICATION

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(71) Applicant: **Rines, Carol M., 13 Spaulding Street, Concord New Hampshire (US)**

(72) Inventor: **Rines, Carol M., 13 Spaulding Street, Concord New Hampshire (US)**
Inventor: **Marshall, Duane, 9 Hadley Road, Lexington Masachusetts (US)**

(74) Representative: **Allsop, John Rowland, Rowland Allsop & Co. Black Boy Yard 15 High Street, West Wycombe High Wycombe, Bucks. HP14 3AE (GB)**

(54) **Bottom margin indicator apparatus for typewriters.**

(57) Bottom-edge margin indicators for typewriter paper and the like using an optical sensor-monitor wherein spurious effects of the edge of the paper exiting from the bottom margin sensor region and pre-printed material thereon are obviated, and in which the sensor-monitor of the bottom edge of the paper is preferably carried by the platen shield (2) itself in a manner that is particularly advantageous for optical sensing of the paper, with the sensor (7–7′) maintained in extremely close proximity to the paper irrespective of its thichness, and adapted for simple and ready adjustment, if desired, to vary the margin setting.

EP 0 177 977 A1

"Bottom Margin Indicator Apparatus
for Typewriters"

FIELD OF INVENTION

The present invention relates to bottom margin indicator apparatus for typewriters and the like.

BACKGROUND OF THE INVENTION

In United States Letters Patent No 4,014,427 of co-applicant Carol M Rines herein, improved apparatus is disclosed for sensor-monitoring the bottom edge of the paper within a typewriter, preferably off-center toward the side, and for effecting adjustable calibration settings near a side of the platen; and earlier proposals are described in the other patents referred to in said Letters Patent. The restriction on location of the sensor and the specialized equipment modification and nature of adapting these techniques for inexpensive and simple retrofitting or remodification of existing typewriter models by the secretary or unskilled operator have, however, constituted problems in rendering these improvements readily useable commercially with universal applicability. It is to the solution of these and related problems, accordingly, that the present invention is primarily directed.

SUMMARY OF THE INVENTION

An object of the invention, therefore, is to provide a new and improved bottom margin indicator that shall not be subject to the above-described and similar disadvantages; but that, to the contrary, provides for a much more simplified modification of existing typewriter components--in particular, only a part of the paper shield structure--,

and the provision of a retrofit therefor that can be installed by unskilled hands, and that, indeed, can be identically used as part of the original equipment as manufactured and assembled, as well.

A further object is to provide such a novel margin indicator that is particularly and preferably, though not exclusively, adapted for typewriters with axially immobile platens and paper shields, as of the electric ball printing head type.

An additional object is to provide such an indicator in which spurious signal effects caused by optical noise effects produced as the bottom edge of the paper passes the sensing region or by pre-printed material are obviated; such improvement being particularly useful with the preferred retrofit structure of the invention, but also more generally useful with other types of margin and similar indicators wherein such problems are encountered.

Other and further objects are explained hereinafter and more particularly delineated in the appended claims.

According to one aspect of the invention there is provided bottom margin indicator apparatus for typewriter paper and the like operating with typewriters having a platen rotatable about its axis and around the cylindrical surface of which the paper is advanced in a transverse path during typewriting, said apparatus having, in combination, cylindrical-section paper shield means mountable below the platen and between the upper surface of which and the platen the paper is thus advanced; monitor means mounted in close proximity to said path in proximity to, the paper passed between the same and the platen irrespective of thickness of the paper; signaling means connected to and responsive to the sensing by the monitor means of the absence of paper following the presence of the paper thereat for providing an indication

of the advent of such absence; and means for preventing spurious signals from being applied by said signaling means that would effect spurious and multiple indications as the bottom edge of the paper or pre-printed material passes by the monitor means.

According to another aspect of the invention there is provided bottom margin indicator apparatus for typewriter paper and the like in which the paper is advanced in a predetermined path, monitor means mounted in close proximity to said path in non-intefering relationship with, but in close proximity to, the paper; signaling means connected to and responsive to the sensing by the monitor means of the absence of paper following the presence of paper thereat, for providing an indication of the advent of such absence; and means for preventing spurious signals from being applied by said signaling means that would effect spurious and multiple indications as the bottom edge of the paper or pre-printed material passes by the monitor means.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the accompanying drawing, Fig 1 of which is a plan view of the portion of a cylindrical paper shield equipped with the preferred construction of the invention;

Fig 2 is a fragmentary side elevation of the optical monitor region of the shield;

Fig 3 is a diagram of a preferred electronic system for the monitor and signaling means, including more generally applicable paper edge noise-effect suppressing circuits; and

Figs 4A, 4B, and 4C are wave-form diagrams of the operation of the spurious-signal obviating circuit of Fig 3.

BEST MODES OF CARRYING OUT THE INVENTION

Referring to the drawings, the invention is illustrated, Fig 1, in connection with its specific preferred, though not exclusive, application to the said ball printing head (B) type typewriter, with the longitudinally axially immobile paper or platen cylinderical-section shield shown at 1 adapted to receive paper between its upper surface and the similarly immobile platen thereabove (not shown), between which the typewriter paper is advanced in a transverse path during typewriting, as schematically indicated by the dotted arrow labelled "PAPER". The shield is shown with conventional apertures 1' for the paper rollers conventionally mounted thereunder.

The paper shield 1 is provided with a simple modification; namely, a transverse depression 3 that is apertured at 5 with a transverse slot, preferably to the side of the central region of the shield as shown. The edges of the aperture 5 at the side walls 3' of the depression 3 serve as a track for the mounting and securing of the sensor 7-7' that is to monitor the bottom margin of the paper as it passes between the upper shield surface 1 and the platen, giving a signal warning, as by a buzzer 4 (Fig 2) energized by a signaling circuit 8 responsive to the sensor 7-7' via conductors 6, indicative of the fact that the desired bottom margin has been reached, as generally explained in said Letters Patent.

In the preferred embodiment, the monitor sensor is in the form of a combined photo-emitter 7 and photo-receiver 7' that respectively transmit light to the paper and receive reflections therefrom so long as it is present, producing a change of signal when the absence of paper is indicated by the sensing of the black platen. The monitor sensor 7-7' is shown centrally held just below or substantially in line

BAD ORIGINAL

with the upper surface of the shield by the lower portion of an assembly block, preferably comprising a depending U-shaped resilient clip fixture 9 with orientation means, such as top lips or flanges 9' that extend laterally over and ride upon the track 3' of the shield depression 3, with the unit 7-7'-9 depending within the slot 5. This enables secured resilient clipping or clamping engagement that locks or maintains the monitor sensor 7-7' at the desired predetermined region of the aperture 5. The unskilled operator can readily force-slide the assembly block 9 with its central monitor sensor 7-7' along the slot edges 3' to other desired predetermined regions of the aperture 5, as indicated, for example, in Fig 1 by the illustrated calibration marks 2, representing a varied or different preselected bottom margin.

The signaling circuit 8 and audible signal buzzer or other means 4 may be in a separate package as shown in Fig 2, or it may be located attached to the photo sensor assembly 7-7'-9 for economy of manufacture and installation. Power may be obtained from a power cord 10 or by a probe-type connection for tapping into the power-carrying cord of the typewriter, if electric.

A preferred signaling circuit 8 is shown in Fig 3 responsive to the sensor's indication of the passing of the sheet beyond the monitoring predetermined region of the aperture 5, corresponding to the desired bottom margin, and producing, for example, an audible signal tone indication at the speaker 4. In this circuit, the ac power applied at 10 is rectified by the rectifier CR1 into dc power supply voltage, say 12 volts, stored through series resistor R1 in the shunt capacitor C_1. The light-emitter diode section 7 of the monitor sensor 7-7' and the light-sensitive receiver section 7' are connected, respectively through resistors R_2 and R_3, between the +12V and "ground" side of the voltage supply, shining light upward through the aperture 5

towards the place where the paper passes, as shown in dotted lines, and receiving one kind of reflection signal back from paper, if it is present and a very different reflection signal from the dark platen in the absence of paper. The emitter-receiver 7-7' is shown at Z_2 in a common envelope, such as the Optronics Type 710 reflective-coupled photo emitter-receiver.

The output 7" of the photo receiver 7' is applied to an integrated circuit shown as Z_1-Z_1' comprising half of a Schmidt trigger circuit and a one-shot pulse circuit, such as a Type 4013 integrated circuit (CMOS Dual D flip-flop). The Q output of the Schmidt trigger section Z_1 (having input from 7' applied at S and with pins C, D and R connected to the +12V terminal) is fed to the C pin of Z_1' in conventional Schmidt trigger circuit fashion. The Q output of the one-shot section Z_1' is connected to the signal input pin C of the buzzer or other indicator 4, charging capacitor C_2 through resistor R5. In effect, a toggle-type flip-flop is provided (Q), to generate an unambiguous buzzer-control pulse signal of predetermined duration, shown in the waveform of hereinafter described Fig 4C.

In operation, as the bottom edge of the paper passes out of the region where the light emitted from 7 reflects from the same and generates reflected signals upon the photo receiver 7', or where pre-printed material on the paper may be present, there are spurious noise effects generated at the output 7" of Z_2 which give rise to multiple and ambiguous triggering of the one-shot Z_2' and hence give rise to spurious energizing of the buzzer or other indicator 4. This is indicated by the erratic jagged waveform of Fig 4A, with the arrows indicating such effects upon paper entering (downwards) and paper exiting (upward), as labelled. By employing the hysterisis effect introduced by the bi-stable nature of the half Schmidt trigger circuit Z1, as shown

in the waveform of Fig 4B (Q output of Z1), injecting bias via resistor R4 back to the input, the noise effects and resulting spurious triggering is avoided at the edge of the paper. The data input transferred to the Q output of the one-shot Z_1' latches up by the effective toggle flip-flop action (Q-$\bar{Q}$), charging C_2 through R_5, as before-stated, with resetting upon the reaching of a threshold. The time constant involving C_2 and R_5 thus controls a definitively triggered unambigious independently generated signal output pulse at Q (Fig 4C), independent of noise effects received at 7', for driving the buzzer 4 for the predetermined duration of the output pulse of Fig 4C.

Suitable circuit values with the Optronics 710 sensor Z_2 and the 4013 integrated circuit Z_1-Z_1', are: R_1=5K; CR_1-1N4002 type; R_2=1K; R_3=22K; R_5=1M; C_2=5μf. For such operation, the duration of the output pulse of Fig 4C will be of the order of about 0.4 second. Clearly this technique for removing spurious edge signals is useful with other types of margin or related sensor systems, though particularly advantageous with the shield-mounted preferred structure of Figs 1 and 2. Other types of indicators and signal driving circuits therefor may also be used, as discussed, for example, in said Letters Patent.

Thus, an extremely effective and simple installation is provided, with minimal change of existing typewriter components, and with no limitation on position of the monitoring slot region, and with the added advantage that, the sensor is held in as close proximity to the upper surface of the shield and thus the paper as possible (with the assembly block 9, depending below said surface on its underside) without mechanically interfering with the passage of the paper, and universally effective with any thickness of paper, as accomodated by the resiliency of the platen. Obviating or suppressing of spurious edge signals is also effected.

CLAIMS

1. Bottom margin indicator apparatus for typewriter paper and the like operating with typewriters having a platen rotatable about its axis and around the cylindrical surface of which the paper is advanced in a transverse path during typewriting, said apparatus having, in combination, cylindrical-section paper shield means mountable below the platen and between the upper surface of which and the platen the paper is thus advanced; monitor means mounted in close proximity to said path in proximity to, the paper passed between the same and the platen irrespective of thickness of the paper; signaling means connected to and responsive to the sensing by the monitor means of the absence of paper following the presence of paper thereat for providing an indication of the advent of such absence; and means for preventing spurious signals from being applied by said signaling means that would effect spurious and multiple indications as the bottom edge of the paper or pre-printed material passes by the monitor means.

2. Bottom margin indicator apparatus as claimed in claim 1 and in which said spurious signal preventing means comprises means responsive to the hysterisis effect resulting between signals produced upon paper entering and exiting from the region of said monitor means for generating an unambiguous indicator signal following such exiting.

3. Bottom margin indicator apparatus as claimed in claim 2 and in which said hysterisis effect responsive means comprises a Schmidt circuit responsive to the output of said monitor means coupled to a one-shot circuit for generating said indicator signal as a pulse

of predetermined duration.

4. Bottom margin indicator apparatus for typewriter paper and the like in which the paper is advanced in a predetermined path, monitor means mounted in close proximity to said path in non-intefering relationship with, but in close proximity to, the paper; signaling means connected to and responsive to the sensing by the monitor means of the absence of paper following the presence of paper thereat, for providing an indication of the advent of such absence; and means for preventing spurious signals from being applied by said signaling means that would effect spurious and multiple indications as the bottom edge of the paper or pre-printed material passes by the monitor means.

5. Bottom margin indicator apparatus as claimed in claim 4 and in which said monitor means comprises photo sensing means responsive to illumination of the paper.

6. Bottom margin indicator apparatus as claimed in claim 5 and in which said spurious signal preventing means comprises means responsive to the hysterisis effect resulting between signals produced upon paper entering and exiting from the region of said monitor means for generating an unambiguous indicator signal following such exiting.

7. Bottom margin indicator apparatus as claimed in claim 6 and in which said hysterisis effect responsive means comprises a Schmidt circuit responsive to the output of said monitor means coupled to a one-shot circuit for generating said indicator signal as a pulse of predetermined duration.

8. Bottom margin indicator apparatus as claimed in claim 4 in which said spurious signal preventing means comprises means operable during the sensing of spurious noise signals resulting

from the passage of the bottom edge of the paper by the monitor means for generating an independent unambiguous signal for controlling the indication of the reaching of the bottom margin.

0 177 977

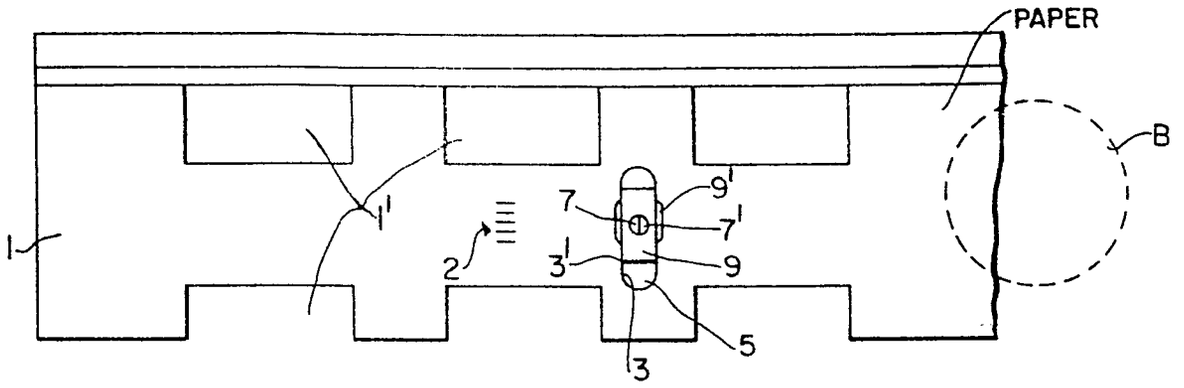


FIG. 1

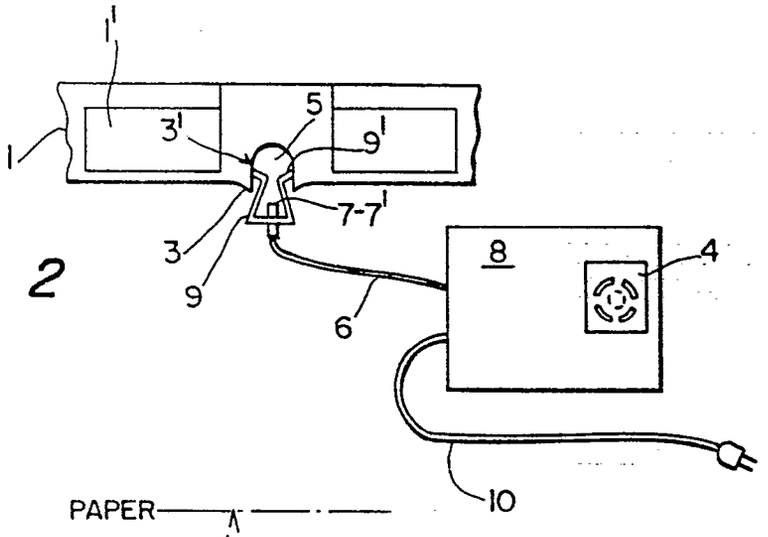


FIG. 2

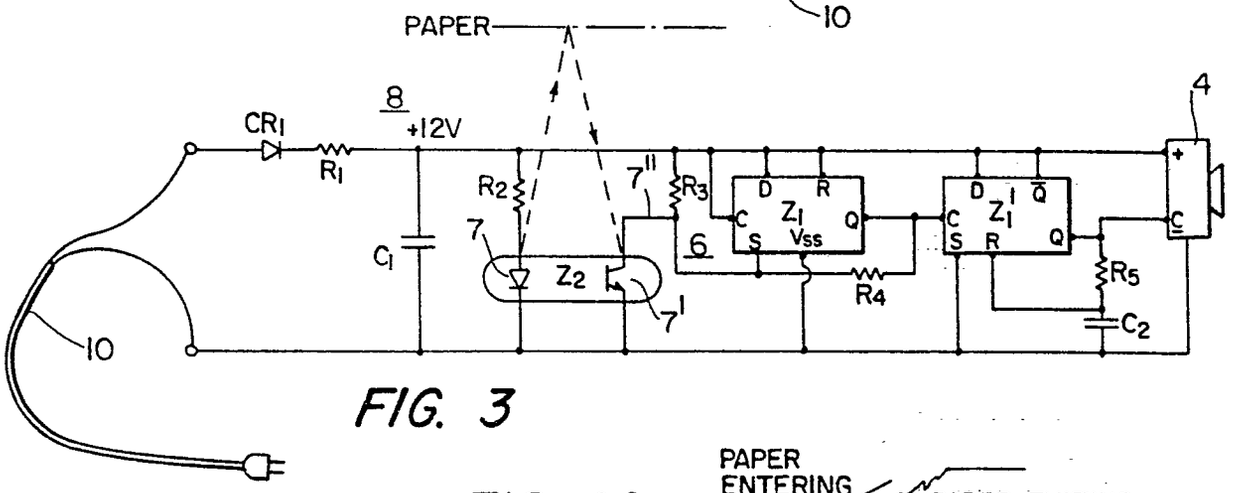
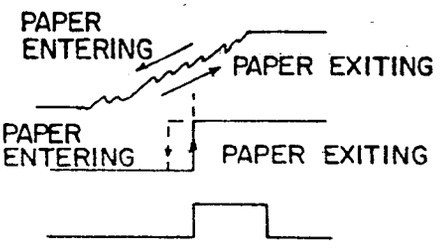


FIG. 3

FIG. 4A

FIG. 4B

FIG. 4C



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EUROPEAN SEARCH REPORT

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EP 85 11 3075

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	US-A-3 981 388 (R.L. GUILIANI) * Whole document *	1,4	B 41 J 29/48 H 03 K 17/94
A		5	

Y	US-A-4 270 046 (P.M. WERKING) * Whole document *	1,4	
A		2,3,6-8	

A	US-A-4 097 731 (T.R. KRAUSE) * Column 4, line 58 - column 7, line 32; figures 4,5 *	2,6	
	---		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	CONTROL AND INSTRUMENTATION, vol. 11, no. 7, July/August 1979, page 13, Morgan-Grampian Ltd., London, GB; "Design Notes. Light-activated switch controls street lighting"		B 41 J H 03 K

A	DE-A-1 812 168 (H. WALTERSDORF)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10-02-1986	VAN DEN MEERSCHAUT G

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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